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| WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201 | | | | |
| | | | EXAMINER SONG, MATTHEW J | |
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1722

DATE MAILED: 07/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/822,208

Applicant(s)

BLOMILEY ET AL.

Examiner

Matthew J. Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/8/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 11-15 and 39-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 16-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-10 and 16-38, drawn to a deposition apparatus, classified in class 118, subclass 712.
 - II. Claims 11-15 and 39-49, drawn to a method of assessing temperature of a wafer, classified in class 117, subclass 85.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used in another materially different process, such as a process where substrate and susceptor are not spinning or the deposited film is amorphous.

3. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with David Latwesen on 6/26/2006 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-10 and 16-38.

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Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-15 and 3-49 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Sorensen et al (US 5,782,974).

Sorensen et al discloses a temperature measurement system for using in a deposition system (Abstract). Sorensen et al discloses a substrate susceptor 12 and a susceptor to heat a substrate 10 to an appropriate temperature for deposition (col 4, ln 10-35), this reads on applicant's heating source for providing thermal energy to the substrate. Sorensen et al also discloses a infrared radiation detector 18 and output from the detector is provided to a computer

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19 that calculates a temperature on the basis of the measured intensity of infrared radiation (col 7, ln 1-25), this reads on applicant's signal processor in data communication with the detector and configured to process at least one signal from the detector and correlate the data signal with a temperature of the substrate. Sorensen et al also discloses an optical path extends from the backside of the substrate through a channel 20 formed in the susceptor to the infrared detector (col 4, ln 45-67), this reads on applicant's radiation conduit.

Referring to claim 2, Sorensen et al discloses the channel is formed in the susceptor (col 4, ln 55-67 and Fig 1).

Referring to claim 9, Sorensen et al discloses a substrate 10 with a front and backside (col 4, ln 25-67).

Referring to claim 10, Sorensen et al discloses a tube like lightguide 28, this reads on applicant's fiber, and measuring infrared radiation (col 7, ln 1-25).

8. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 102(e) as being anticipated by De Boer (US 2006/0057826).

De Boer discloses an apparatus for maintaining wafer temperature during deposition (Abstract). De Boer discloses one or more optical fibers 37,38 in a susceptor 30 monitor radiation emitted by the backside of the wafer 33 ([0009]). De Boer also discloses the optical fiber is connected to a measuring device. De Boer discloses heating lamps and heating the wafer to approximately the same temperature as the susceptor ([0019] and [0030]), this reads on applicant's heating sources. De Boer discloses the optical fiber is connected to a measuring

device for wafer temperature control and signal levels from the optical fibers are measured and measure temperature ([0032-0035], [0038])

Referring to claim 2, De Boer discloses one or more fibers may be inserted into the susceptor ([0036]).

Referring to claims 3-4, De Boer discloses one or more optical fibers may be inserted into the susceptor where one fiber monitors a center of the wafer and a second monitors the edge of the wafer and additional fibers can be used to suppress edge to center variations of the wafer ([0036]), this reads on applicant's plurality of radiation conduits associated with the annular regions of a substrate. De Boer also discloses susceptor rotation ([0042]).

Referring to claim 5, De Boer discloses fibers with the susceptor and the susceptor 30 rotates ([0042]). The portion fiber within the rotating susceptor reads on applicant's first portion and the portion of the fiber connected to the stationary measuring ([0042]) means reads on applicant's second portion.

Referring to claim 6, Each fiber has a first and second portion, this reads on applicant's one to one ration.

Referring to claim 8, De Boer discloses the fiber inserted into the susceptor ([0036]).

Referring to claim 9-10, De Boer discloses measuring the backside of the wafer using a fiber ([0031]).

9. Claims 16-32 are rejected under 35 U.S.C. 102(b) as being anticipated by McMillin et al (US 6,333,272).

McMillin et al discloses an apparatus for processing semiconductor substrates comprising a chamber 10 for chemical vapor deposition (col 4, ln 1-55). McMillin et al also discloses a flow line system configured to combine a first gas 16 and a second gas 18 to form a mixture in a mixing manifold 28 and flowing the material downstream to a chamber 10 via supply lines 12, 14 (Fig 1 and col 4, ln 30-67), this reads on applicant's flow line system downstream from a location where the first and second gases are combined. McMillin et al also discloses flow measurement device 34, this reads on applicant's mass flow meter, and a feedback control valve (col 4, ln 40-67 and Fig 1). McMillin et al also discloses conventional mass flow controllers, MFC, are used in lines 12 and 14, which are downstream from where the first and second gases are mixed (col 6, ln 1-65), these MFCs read on applicant's mass flow controller, which is not a simple valve.

Referring to claims 17-18 and 20, 24-25, 27, McMillin et al discloses a mass flow controller 36 and a mass flow meter 34 downstream from where the gases are combined in the mixing manifold 28.

Referring to claim 19, 26, McMillin et al discloses an analog feedback control system for controlling flow (col 4, ln 30-40).

Referring to claims 21 and 22, 31, 32, this case merely further limits the claim by specifying an intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The apparatus taught by McMillin et al is capable of supplying hydrogen gas or a dopant gas; therefore meets the claim.

Referring to claim 22, McMillin et al discloses third source gas **20** can be used, this reads on applicant's additional gas.

Referring to claim 23, McMillin et al discloses a chamber **10**, a first gas **16**, a second gas **18**, a flow line system and a mass flow controller **36** and a mass flow meter **34**.

Referring to claim 28, McMillin et al discloses two flow paths **12** and **14** each, where each path has a flow meter **42**, **34** (Fig 3).

Referring to claim 29, McMillin et al discloses two flow paths **12** and **14** each, where each path has a flow controller **44**, **36** (Fig 3).

Referring to claim 30, McMillin et al disclose a first path **12** with a mass flow controller **44** and a mass flow meter **42**, and a second path **14** with a mass flow controller **36** and a mass flow meter **34** (Fig 3).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Boer (US 2006/0057826) as applied above to claims 1-6 and 8-10, and further in view of Adams et al (US 2002/0139790).

De Boer teaches all of the limitations of claim 7, as discussed previously, except the second conduit components are not in a one-to-one correspondence with the first conduit components.

In a method of measuring temperature, note entire reference, Adams et al teaches radiation detector may include a split optical fiber having a first branch and a second branch configured so that the outer portion of the radiation enters the first branch and the central portion of the radiation enters the second branch ([0020]), this clearly suggest a non one to one ratio because the split region would be two. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify De Boer by using a split branch fiber, as taught by Adams et al, to measure the central and outer portions using a single detector.

Referring to claim 7, the split optical fiber results in a change in the correspondence of first and second portions because the portion of the optical fiber prior to the fiber being split results in a 2:1 correspondence.

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12. Claims 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over McMillin et al (US 6,333,272) as applied to claims 16-32 above and further in view of Rocha-Alvarez et al (US 2003/0005958)

McMillin et al discloses all of the limitations of claim 33, as discussed previously, except a first header within the flow line system which splits the first gas into separate channels which separately combine with the second gas to form separate mixtures directed toward separate chambers and a second header within the flow line system which splits the second gas into separate channels which separately combines with the first gas to form a separate mixtures directed toward separate chambers.

In an apparatus for controlling process gases into a tandem process chamber, note entire reference, Rocha-Alvarez et al teaches splitting a first gas **177** into two separate flows **191**, **185** using a splitter **133** (Fig 5 and [0033]-[0035]), this clearly suggests applicant's first header, which splits the first gas into separate channels. Rocha-Alvarez et al also teaches splitting a second gas **177B** into two separate flows **191B**, **185B** using a splitter (Fig 5 and [0033]-[0035]), this clearly suggests applicant's second header, which splits the gas into separate channels. Rocha-Alvarez et al also teaches combining the flows **191** and **191B** prior to entering a chamber **120**, and combining the flows **185**, **185B** prior to entering a chamber **118** (Fig 5 and [0033]-[0035]), this clearly suggests .

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify McMillin et al by using a multi-chamber process by splitting source gases and combining the gas separately, as taught by Rocha-Alvarez et al in order to increase production by allowing multiple processes to be performed simultaneously.

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Referring to claims 33 and 35, the combination of McMillin et al and Rocha-Alvarez et al teaches a first header **133**, a second header **133B** and placing mass flow controller and mass flow meter prior to splitting the flow of gases ('272 Fig 3), which clearly suggests placing at least one mass flow controller and a mass flow meter upstream of the first and second headers, where the mass flow controller is other than a simple valve.

Referring to claims 34, 37 and 38, these claims merely further limits the claimed invention by specifying an intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The apparatus taught by combination of McMillin et al and Rocha-Alvarez et al is capable of supplying hydrogen gas, dichlorosilane or a dopant gas; therefore meets the claim.

Referring to claim 36, the combination of McMillin et al and Rocha-Alvarez et al teaches a first gas **A** and a second gas **B** ('958 Fig 5), this clearly suggests using a second gas different from a first gas.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Carpenter et al teaches using a mass flow controller **88** proximate a reaction chamber (Fig 1 and [0021]).

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1722

MJS
June 29, 2006


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